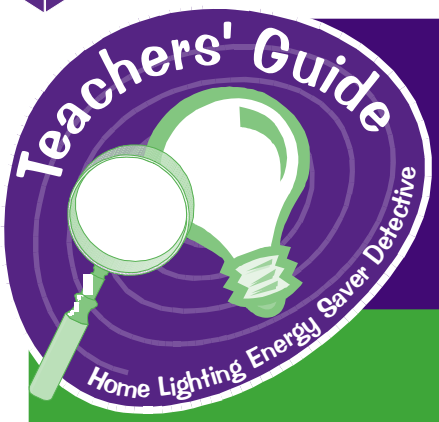


Overview: Activity Four

Electricity is one form of energy that is useful to just about everyone. Individuals who use energy-efficient lights can take advantage of this valuable power source at a lower cost with less impact on the environment. In this activity, your students use the results of their home lighting energy-saver scientific investigation steps 1-4 to determine if their initial thoughts about compact fluorescent lights, energy and the environment were based on fact or opinion.

Levels:

Grades 4-7

Subject:

Real-life applications of science and social studies

Concepts:

- Distinction between science and technology via key concepts like energy, power, efficiency, and compact fluorescent lights
- Relationship between reducing energy use, less air pollution, and a lower utility bill
- Individuals can prevent pollution, reduce energy consumption, and lower their individual utility bills by replacing their incandescent and halogen torchiere light fixtures with ENERGY STAR® CFL fixtures

Skills:

Scientific investigation, observing, interpretive thinking, distinction between fact and opinion

Objectives:

- Students will understand how to use a scientific investigation to make decisions that cut costs, save energy, and help the environment
- Students will complete step 5 of the home lighting energy-saver detective scientific investigation

Materials:

- Energy and environment in-class instruction materials (pp. 23, 28)
- Energy-saving Clue sheet (p. 27)
- "Conclusion: was my hypothesis about energy savings and pollution prevention correct?" (pp. 15-16)

Background

American homes contain over 3 billion light fixtures. The energy used to operate these fixtures amounts to about 138 billion kilowatt-hours of energy per year—between 6% and 10% of the total residential electricity use. This costs consumers nearly $11 billion annually and results in air emissions of approximately 100 million tons of carbon dioxide. Studies have shown that 25% of the typical home's lighting fixtures account for 75% of lighting energy. By introducing energy-efficient fixtures for these "high-use" sockets, (i.e. kitchen lights, table lamps, and floor fixtures in living rooms, and outdoor fixtures), 70 billion kilowatt-hours could be saved annually.

Getting ready

1) Retrieve the transparencies you made from page 23, 27, and 28.

2) Make a copy of the worksheet, "Conclusion: was my hypothesis about energy savings and pollution prevention correct?" (pp. 15-16) for each student in the class. (see Fig. 4.1.)

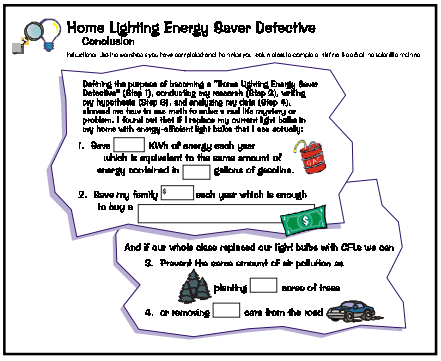

Home Lighting Energy Saver Detective
Conclusion

Fig. 4.1.

Doing the Fourth Activity

1. Review the steps of the home lighting energy-saver detective scientific investigation with the transparency you made from page 28.

2. Remind the students that they will use the data they collected from their research, hypothesis, and analysis worksheets to write their conclusion.

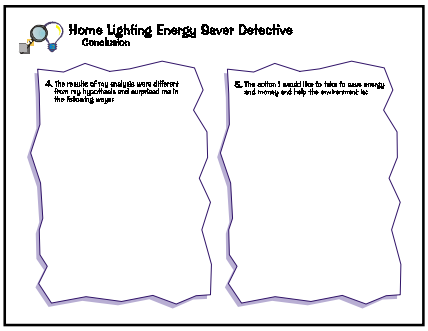
3. Show the students the transparencies you made from pages 23 and 27.

4. Hand out the worksheets "Conclusion: was my hypothesis about energy savings and pollution prevention correct?" (see Figure 4.1)

5. Ask a few students at random to present their information to the class. Consider dividing the children into groups and asking them to aggregate their information into one conclusion to present to the class next week.

6. After the presentations are complete, ask the class to reach consensus on the answer to the original question and purpose of the activities:

Can our class use less energy, prevent air pollution, and save money by replacing our light bulbs with compact fluorescent lights (CFLs)?


Home Lighting Energy Saver Detective
Conclusion

Home Lighting Energy-Saver Detective

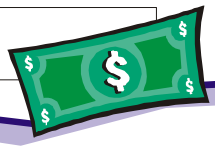
Conclusion: Was my hypothesis about energy savings and pollution prevention correct?

Instructions: Use the worksheets you have completed, the clue sheets available from your teacher, and the notes you took in class to complete this final Step 5 of the scientific investigation.

Defining the purpose of becoming a "Home Lighting Energy Saver Detective" (Step 1), conducting my research (Step 2), writing my hypothesis (Step 3), and analyzing my data (Step 4), showed me how to use math to solve a real life mystery. I found out that if I replace my current light bulbs in my home with energy-efficient compact fluorescent light (CFL) bulbs that I can actually:

1. Save _____ KWh of energy each year which is equivalent to the same amount of energy contained in _____ gallons of gasoline, and

2. Save my family $ _____ each year which is enough to buy a _____



If our whole class replaced our light bulbs with CFLs we can

3. Prevent the same amount of air pollution as

planting _____ acres of growing trees

4. or removing _____ cars from the road

Real life Math and Science Activities provided by U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy; Office of Building Technology, State and Community Programs

Home Lighting Energy-Saver Detective

Conclusion: Was my hypothesis about energy savings and pollution prevention correct?

4. The results of my analysis were different from my hypothesis and surprised me in the following ways:

5. Based on my scientific investigation, I would like to:

- ☐ replace incandescent light bulbs with CFLs
- ☐ ask my parents to look for the ENERGY STAR label the next time they buy light bulbs, dishwashers, washers, refrigerators, computers, stereos, televisions, heating and cooling equipment, windows, and other products.

6. Explain your answer in 5 (continue on the back if needed)

Real life Math and Science Activities provided by U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy; Office of Building Technology, State and Community Programs